

REMARKS/ARGUMENTS

Favorable reconsideration of the present application is respectfully requested.

Initially, Applicants note that the Examiner has failed to indicate consideration of Japanese Patent Publication 2001-295863, cited in an Information Disclosure Statement on April 1, 2004. Consideration of this reference is respectfully solicited.

Claim 3 has been amended to clarify that the friction clutch has plural friction contact surfaces. Claim 10 has been amended to clarify that the armature comes into frictional contact with the pilot inner plate.

According to a feature of the invention set forth in the claims, a drive power transmission device includes an electromagnetic clutch mechanism which has a friction clutch comprising friction contact surfaces. The invention includes a clutch magnetic path whose magnetic flux passes to reciprocate plural times across the friction clutch whereby the friction contact force can be strengthened. Consequently, a smaller number of clutch plates can be provided (see paragraph bridging pages 2-3). For example, referring to the non-limiting embodiments disclosed in the specification, the magnetic flux path M (Figure 3) is caused to reciprocate across the clutch 32 two times, due to the radially divided magnetic path areas 441-444 of the clutch outer plates 44, and the radially divided magnetic path areas 451-454 of the clutch inner plate 45. The number of friction plates can be reduced (Figures 10 and 11) but must provide at least two friction contact surfaces (page 12, lines 13-14).

Claims 1, 2 and 10 stand rejected under 35 U.S.C. § 102 as being anticipated by U.S. patent 6,098,770 (Isley). The Examiner there alleged that an electromagnetic pilot clutch is provided at 200 and has a pilot outer plate at 182 and a pilot inner plate at 192. The Examiner further alleged that a “weaving” electromagnetic path is described at column 6 of the reference.

In fact, Isley fails to even disclose an electromagnetic type clutch mechanism having a friction clutch including plural friction contact surfaces. As the Examiner has stated, an electromagnetic clutch mechanism is provided at 200, whereby a circular armature 182 having “banana slots” 184 (column 6, lines 7-9) is positioned opposite a rotor 192 having banana slots 194 (column 6, lines 14-17). The function of the “banana slots” is described as creating “a sinuous magnetic flux path which improves operation of the disc pack clutch assembly 120B and increases its torque throughput” (column 6, lines 18-21). The manner in which the sinuous magnetic flux path “improves operation” and increases torque throughput is not described, but is evidently related to the operation set forth beginning at line 32 of column 7 of the reference. Specifically, as is described beginning at line 38 of column 7:

As current flow to the electromagnetic coil 200 commences and increases, drag is created which attempts to slow rotation of the rotor 192, causing relative rotation between the first and second circular members 210 and 218.

Significantly, there is no description of frictional contact between the armature 182 and the rotor 192. Instead, the slowing of the rotor rotation is described as being induced by “drag” created by the current flow in the coil 200. This evidently refers to electromagnetic drag, possibly induced by the interaction of the banana slots 184, 194. In any case, *frictional contact is neither explicitly described nor inherent in the structure of Isley.*

Thus, Isley fails to disclose the “plural friction contact surfaces” of Claims 1 and 3, the pilot outer and inner plates in “friction contact with each other” of Claim 6, or the armature in “frictional contact with said pilot inner plate” of Claim 10. The claims therefore clearly define over this reference.

As is well-known to those skilled in the art, “diamond-like carbon” or DLC is a term of art referring to a carbon based material (see, for example, U.S. Patent 6,753,042; column 1, lines 53-55). According to a further feature of the invention, this material is applied to a part

or all of the friction contact surfaces of the friction clutch, leading to increased longevity of the clutch. See Fig. 12; the paragraph bridging pages 12-13 and the remainder of page 13 of the present specification.

Claims 3-5 and 7 were rejected under 35 U.S.C. § 103 as being unpatentable over Isley in view of the U.S. patent 4,988,421 (Drawl et al.). The Examiner there alleged that Drawl et al. would have rendered it obvious to have provided a DLC film on a friction surface. However, it is noted that Drawl et al. simply teaches toughening the structure of a tool by depositing diamond particles, 62, 65 and 67 within layers of binding material on a surface. The diamond particles 62, 65 and 67 are described as being a “diamond-like” particle, but are explicitly crystalline in structure (column 5, lines 49-68; column 6, lines 15-30). Drawl et al. thus fails to disclose the claimed diamond-like carbon, and so could not suggest the use of such a coating in Isley. Claims 3 and 7 therefore define over any combination of Isley and Drawl et al.

Dependent Claim 11 further recites a magnetic flux isolation member. Claim 11 was rejected under 35 U.S.C. § 103 as being obvious over Isley in view of U.S. patent 5,735,375 (Booth et al.), which was cited to teach an electromagnetic isolation member. However, Booth et al. would not render it obvious for those skilled in the art to provide a friction clutch in Isley, and so no combination of the above references would teach or suggest the subject matter of Claim 10 from which Claim 11 depends.

Concerning the claim objections, Applicants note that, contrary to the objections, the terms “relative” and “magnetic” are correctly spelled throughout the claims.

Applicants therefore believe that the present application is in a condition for allowance and respectfully solicit an early Notice of Allowability.

Respectfully submitted,

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